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inclusive, 1876, and (2) 96.50 inches at Silver Hill, Jamaica, in November, 1909. The Indian station, located upon the Himalayan slopes, near the Bay of Bengal, remains the wettest spot on the globe. It is reported that during one month, August, the rainfall measured 384 inches, and it is believed that the annual precipitation is over 600 inches.

#### A NEW WEATHER SIGNAL

SINCE December 1 a new marine signal consisting of a red pennant has been displayed by the United States Weather Bureau to signify the approach of high winds which would not justify the issue of the regular storm warning. It is known as the "small craft warning," as it is designed especially for the owners of fishing, towing, motor and yachting craft. The pennant is flown from the officially designated flagstaffs on the Atlantic, Pacific and Gulf coasts, as well as along the borders of the Great Lakes. Judging from recent press reports the innovation is proving of value to those for whom it was intended.

#### CONCERNING AVIATION FATALITIES

AMONG the suggestions which have been offered to explain various fatal accidents in aviation recently is that which one aviator describes as "ethereal asphyxia, a dreadful something which lurks in the upper air and creeps irresistibly upon the senses of the aviator, lulling him into a dreamy unconsciousness." He declared that it was not due to rarefied atmosphere, as there was no stifling, choking or pain in the ear-drums, such as often results from decreased pressure. The falsity of the explanation is apparent to any one who considers the matter, for aeronauts have, for more than a century, ascended to far greater heights than the aeroplane has yet reached, and no "mysterious gas" has been reported. Soundings of the free air have established the fact that up to the greatest height attained by an aeroplane, about two miles, the composition of the atmosphere is sensibly the same as at the ground. However, some of the fatalities occurring can not be explained by mechanical defects, gusts of

wind, or "air-holes." Might not the "ethereal asphyxia" be similar to the drowsiness experienced by certain people in windy weather? Persons who have climbed to the summits of high hills or mountains often express a desire to lie down and sleep. Moreover, the cold aloft is another factor to be considered. One traveling in a balloon experiences a perfect calm about him and thus is not greatly affected by the low temperatures. But every one who has sat in the front seat of a rapidly moving automobile on which there was no wind-shield can readily imagine how chilling must be the air encountered by an aviator traveling against the wind. Even in mid-summer temperatures below freezing are met at a height of two miles, and such air, brushing past the aviator at a rate of a mile a minute, might soon cause temporary paralysis of the limbs, resulting in a loss of control of the craft. The heaviest clothing yet worn by an aviator could hardly give him the protection needed. Accelerated heart-action, nervous tension, fatigue and other factors doubtless contribute to the aviator's distress. The problem is not wholly a meteorological one.

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February 1, 1912

#### SPECIAL ARTICLES

##### ON THE ORIGIN OF AN ALBINO RACE OF DEER-MOUSE

THE first case of Mendelian inheritance shown to exist among animals was that of total albinism in mice. In this condition the fur is snow-white and the eyes are pink, they like the fur being entirely devoid of skin-pigment. For the pink color of the eyes is due to the blood seen through the transparent eye; it disappears at death.

The ordinary white mouse is an albino variety of the common house mouse, with which it crosses readily. Cross-bred offspring ( $F_1$ ) are never white, but like the wild parent in color. But in the next generation ( $F_2$ ), part of the offspring are albinos. On the average one fourth are albinos, and these breed true in accordance with Mendel's law.

The time and place of origin of the common white mouse is entirely unknown; the same is true of nearly all distinct varieties of animals either domesticated or wild. Peculiar interest therefore attaches to a case in which an albino race has arisen from a wild species. Such a case I will now briefly describe.

The native field mouse of North America is known by several different common names, such as deer mouse, field mouse, white-footed mouse and wood mouse. Systematic zoologists at the present time give it the generic name *Peromyscus*. The most recent and exhaustive study of this genus is that of Osgood<sup>1</sup> (1909), who, after examining over 27,000 specimens from all the great collections of America and all other available sources, "conservatively" recognizes 157 distinct species and subspecies.

In the light of this exhaustive study it seems probable that *Peromyscus* is the most abundant and the most widely distributed of North American mammals, as well as one of the most carefully studied from the systematic standpoint. Nevertheless an albino specimen has never up to the present time been reported, which would seem to indicate that its occurrence is very rare.

In the fall of 1909, Mr. K. S. Clark caught in the woods near St. Johns, Clinton County, Michigan, a pure white albino *Peromyscus*. This he kept alive for some weeks and then delivered it to Professor Walter B. Barrows, of the Michigan Agricultural College, where Mr. Clark was a student. Fortunately neither Mr. Clark nor Professor Barrows obeyed the common impulse straightway to make a museum specimen of the rare individual. They tended this unique animal with great care. Later through the kindly interest of Professor W. M. Barrows, of Ohio State University, who was engaged with me in breeding experiments with *Peromyscus*, the albino was sent to me. I received it in Feb-

ruary, 1911, and kept it alive at my house or at the Bussey Institution until January 29, 1912, when it died probably from extreme cold.

In March, 1911, Mr. Clark trapped a dozen other *Peromyscus* near the place where he had caught the albino the previous fall, and sent these to me. All were normal in appearance and referable to *Peromyscus leucopus noveboracensis* Fischer, as described by Osgood. Two of the females were successfully mated with the albino which proved to be a male. During the summer and fall of 1911 they produced 6 litters of young including 28 individuals, all normal in appearance like the mothers. One of the daughters was mated with the albino father in October, 1911. On November 21 she bore a litter of three young, an albino and two ordinary young, but all were eaten the following night. Three weeks later she bore a litter of four young, two being albinos and two normal. The albinos were successfully reared, but no more young have since been born, and as this species does not breed in winter it is not probable that more will be obtained for some months.

The behavior of the albino variation thus far is that of a simple Mendelian recessive, as in house mice, guinea-pigs, rabbits and rats. The experiment has not yet progressed far enough to show whether the albino variation has been attended by variation in any other pigment factor, and so its continuation is awaited with interest. In the other rodents mentioned we have not only albino varieties, but also black ones (lacking a ticking or "agouti" factor), in all except rats yellow ones (with a reduced amount of black), and in mice and guinea-pigs brown ones (lacking black entirely). As nothing is known concerning the origin of these variations, it is uncertain whether they arose simultaneously with the albino variation, or as a consequence of it, or wholly independently of it. As, however, we find the inheritance of these variations to be wholly independent of the inheritance of albinism, it seems probable that in origin also these variations were independent. A case in which observation along these lines is possible is heartily welcomed.

<sup>1</sup> Osgood, Wilfred H., "Revision of the Mice of the American Genus *Peromyscus*," Publication of U. S. Department of Agriculture, Bureau of Biological Survey, N. A. Fauna, No. 28, 285 pp., 8 pls., Washington, 1909.

Men who make a business of producing plant novelties, Burbank, for example, are delighted with the slightest indication of sporting, because they consider that, the "stability of the type" having been disturbed, other variations are likely to follow.

Whether there is any basis of fact for this idea cases like that here described may tend to show, if carefully followed up. If the supposed phenomenon is found to be a real one and an initial color variation is frequently followed by others, then it will remain to discover an explanation, since "instability of type" can scarcely be regarded as an explanation, but only a figurative statement, of a phenomenon observed.

Studies of the inheritance of albinism, as already stated, show it to be independent in transmission of the several factors which determine the particular character of the pigmentation, as gray, black, yellow, etc. For in crosses with colored varieties, albinos actually do transmit to their offspring particular qualities of pigmentation, as gray, black, yellow, etc. It is assumed, therefore, that in the albino variation something has been lost from the organism which is indispensable to the production of pigment, though it has nothing to do with controlling the particular sort of pigment which the organism can form. Albinos, therefore, can be produced of as many different sorts as regards their breeding capacity, as are the visibly different pigmented sorts. Each pigmented sort finds its counterpart among albinos, though all these albinos may look alike. A study of the progeny of an albino through two generations will serve to show with what particular colored variety it corresponds. Such a study has not yet been completed for the albino *Peromyscus*.

The albino variation, being a *loss* variation and recessive in nature, must have existed in both the gametes (the egg and the sperm) which produced the individual captured by Mr. Clark. Both the parents of that individual, accordingly, *transmitted* albinism and probably produced other albino young, if they had more than a single litter of offspring. But the survival of albino offspring in the wild

state would be exceedingly doubtful because of their conspicuousness and their defective vision. Yet the heterozygous brothers and sisters of the albino sports should themselves be at no disadvantage in the struggle for existence and should produce about 25 per cent. of albino young. Therefore we should not be surprised if the sporadic occurrence of albinism should continue in a locality where it has once made its appearance, as in Clinton County, Michigan. The naturalists of that region would perform a service to science by looking for and reporting future occurrences of albinism in field mice there.

In conclusion I wish to express my gratitude to Professor Barrows (father and son) for entrusting to me the experimental study of this interesting variation.

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#### ORIGIN OF THE SEDIMENTS AND COLORING MATTER OF THE RED BEDS OF OKLAHOMA<sup>1</sup>

SINCE the origin of the sediments and the red coloration of the Oklahoma red beds has long been the object of more than ordinary curiosity, it may not be out of place to briefly outline some of the results of a recent study of these deposits.

Previous workers have made known the fact that the light-colored sediments of the lower Permian rocks of Kansas become red in Oklahoma, and that the similar light-colored Albany beds of Texas reddened on approaching Oklahoma. In the Texas reports Cummins hinted that a lateral transition of the Albany beds into the red rocks of the Wichita formation might not be impossible. Later he worked out this transition in detail.<sup>2</sup> Gould and

<sup>1</sup>Published with the permission of the director of the Oklahoma Geological Survey.

<sup>2</sup>The leading recent articles bearing upon this subject are: Cummins, *Trans. Tex. Acad. Sci.*, for 1897, pp. 93-98. Gould, *Kans. Univ. Quart.*, pp. 175-177, 1900; *Amer. Jour. Sci.*, XI., pp. 185-190, 1900; *Trans. Kans. Acad. Sci.*, XVII., pp. 179-181, 1901. Adams, *Amer. Jour. Sci.*, XII., pp.